

The Sears Craftsman® 15" Professional Lathe



Maintenance and Modification Tips

[Removing Spring Assembly](#), [Lubrication Modification](#), [Transmission Maintenance](#),
[Main Drive Belt R&R](#), [Adjusting the Speed Selector](#), [Belt Size Modifications](#),
[Things to Remember](#)

The Craftsman Professional suffers from hydrophobia. If there is the least trace of surface rust on the shafts, the slip clutch will seize. A couple of days in a damp shop will do it. Sears claims a 1/1000 of an inch clearance. They also claim that no lubrication should be used...hmmmm?

So, how do you free up the pulleys and keep them functioning without stripping the whole thing down once the lathe has seized? Sears' suggestion involves removing the covers, followed by the spring assembly, then carefully cleaning the shaft with a very fine sandpaper or steel wool, then wipe everything down with clean cloths, and re-assemble the whole thing, and off you go. If there is precipitation that night, you just do it again the next morning. Isn't that simple? Yeah, right!

To remove said spring assembly, you need 2 people, one pushes on the spring, the other removes the retaining clip and watches the other guy fall flat on his ass as the spring releases. I estimate the spring to be rated at around 75 linear feet. That's about how far I had to go to pick it up and find the clip, the tin cover and it's plastic insert. If your face is in front of the spring when it releases, the 75' rating is shortened considerably.

Alright, so you now know you have 2 problems to resolve. Removing the spring assembly to clean out the shafts, and finding a way to lubricate. As an old mechanic, I have yet to see a place where metal pieces rub together that don't need some form of lubrication. So lets deal with the problems.

Removing the spring assembly.

Remove the top black tray (4 screws on top) and the red cover (2 screws in front, 2 in back)off the headstock.



Figure 1

Figure 1 on the left shows the tool I put together to remove the spring assembly safely. It consist of a 5/16" threaded rod with a nut at one end, a large flat 5/16" washer with two 1/4" holes drilled 180° apart, 2 bolts in the holes with nuts attached, then one more 5/16" washer (no extra holes here) and finally a 5/16" threaded knob. The rod is about 24" long.



Figure 2

Figure 2 shows the tool assembled. The red sledge hammer is what I have many times felt like using but haven't so far!



Figure 3

Figure 3 shows the tool inserted into the spindle viewed from the spring side.



Figure 4

Figure 4 shows the tool inserted into the spindle viewed from the spindle side.

Set the washer with the 2 bolts in such a way that you will have room to reach the retaining clip. Crank the knob and the rod will compress the spring. As soon as the tin cup moves away from the retaining clip, using the proper pliers, remove the clip. It will fall on the rod and stay there. Note that retaining clips have a right and a wrong side. This particular one has a flat surface on one side and a rounded one on the other. The flat side goes on facing the outside of the lathe. If it has not been removed previously and if it was installed right at the factory, just let it hang there and when you reinstall it, it will automatically be the right way.



Figure 5

Figure 5 shows the retaining clip pliers ready to use. You can see the holes in the clip at the top. Click to see a bigger picture.

Once the retaining clip has been removed, unwind the knob and the spring will expand. When the spring is decompressed, remove the knob and flat washer from the spindle side of the rod and remove the assembly as a whole. Note that there is a plastic insert that you couldn't see before between the spring and the tin cup. When you reinstall the assembly, make sure it is positioned right or the spring will bind.

There is a key in the keyway of the pulley and spindle shaft. Turn the pulley until this faces upward, this way when you slide the pulley off, the key won't fall on the floor. You should now be able to slide the pulley off and clean the shaft. If the pulley is hard to remove and does not slide off easily, DO NOT use a pry bar. The face will bend and it can break if enough force is used. In this case, the best thing to do is spray the joint between the pulley and the shaft with WD-40 and work at it, first pushing the pulley in a bit, then pulling out a bit, until it comes loose. Try not to get any lubricant on the belt. When I do this, I use a rag and wrap the belt in it as best I can, then spray. The pulley will eventually come off.

Use 0000 steel wool or fine sandpaper (1000 or so) to clean the shaft and the hole in the pulley. If you wish to follow the Sears directives, wipe everything down with a soft cloth making sure that all is clean and reinstall everything in the reverse order at this point. Otherwise, read on...

Lubrication modification

While you have the pulley's left half in hand, using a 1/8" drill bit, drill 3 holes more or less equally spaced into the shaft part of the pulley. I chose to drill one hole where the keyway is. I don't know if it would be better to or not to. My way works for me. Using a small round file, gently reach inside the hole of the pulley and remove any metal burrs raised by the drilling. You want as smooth a surface here as you can get. Burrs will only scratch the shaft unduly and possibly lead to more problems.



Figure 6

Figure 6 shows one of the holes drilled into the pulley. Click to see a bigger picture.



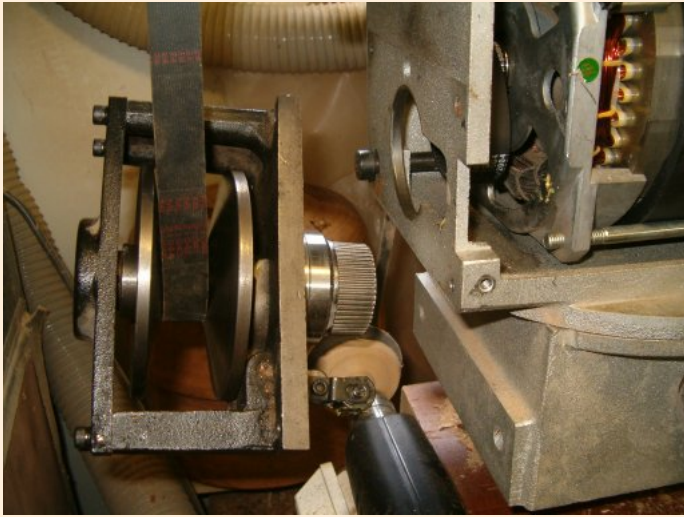
Figure 7

Figure 7 shows the oiler I use to inject a drop or two every 3 to 4 days into the holes. By setting the lathe at the slowest speed, you can turn the spring cover and spring easily and rotate the spindle to access all 3 holes as required. The flex tubing also allows me to gently-gently-gently just dribble a tiny-teeny small amount on the transmission shaft below where the shaft and it's pulley's join. Did I mention teeny-tiny? Eventually, you will probably need to remove the bottom pulley for servicing as well but

doing this teeny-tiny should postpone it a while.

Transmission Maintenance

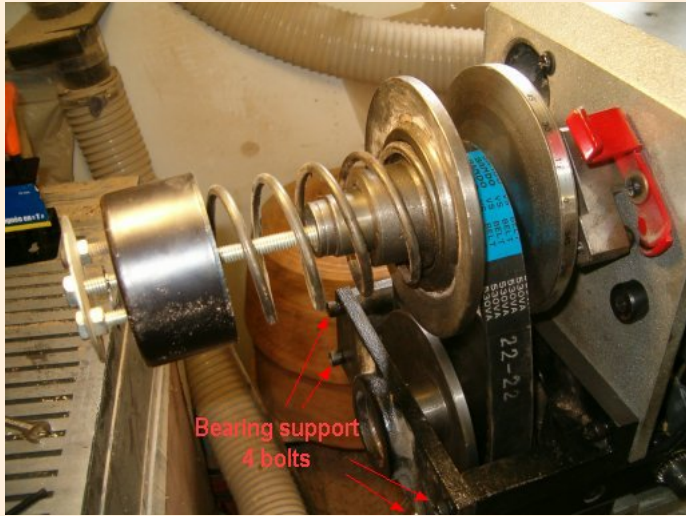
For lack of better terminology, I'll call the Transmission the whole lower section that links the motor to the upper slip clutch. It includes the lower transmission shaft, the lower pulleys, the fork assembly and it's components, and the trasmission gear which is linked to the motor via the main drive belt.



The transmission assembly hanging from the transmission belt.

If your lathe has the same problems mine has pertaining to rust, you may not know that the outer pulley half, as well as the inner half should both slide along the shaft unlike the upper section where only the outer half is mobile. I didn't find this out until I decided to tear the assembly apart. The only thing I had ever done was to remove the outer bearing support plate to squeeze a new transmission belt on. It turns out, I shouldn't have had to squeeze anything. The bearing and outer pulley half should slip off the shaft.

To take the transmission apart and clean it up,

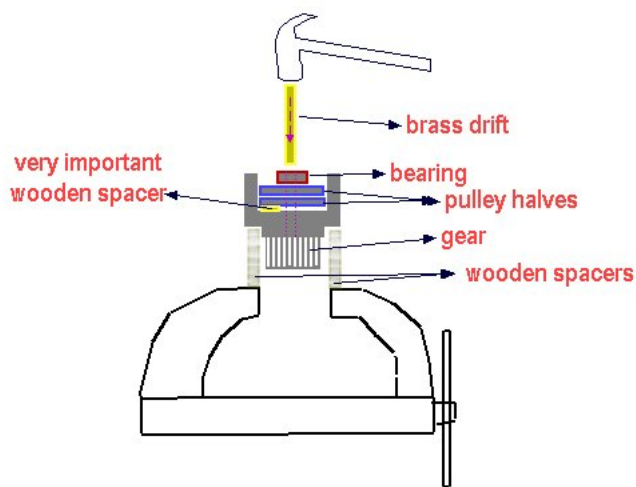


Remove the 4 bolts holding the outer bearing in place.

Because of the surface rust, I could not remove the bearing and the outer pulley half from this point. DO NOT try to pry them off unless you have already purchased replacements in which case it don't really matter, does it? I found that removing the whole transmission was the best way. Remove the inner bearing support by undoing the 4 bolts and take everything to the bench .

I propped up the transmission on 2 spacers, on my bench vise. The spacers were to allow the shaft to go all the way through without hitting the vise at the bottom. A second spacer has to be placed under the pulley half that is now on the bottom. Look at the bearing support plate and you will notice that there is a high spot on one side only. If you were to pound the shaft without additional support to the pulley, it would probably break.

Look at the schematic below to see how I did.



Note the additional spacer to hold the pulley half aligned. Use a brass drift to push the shaft through so that the shaft is not damaged. My shaft was seized so hard against the outer pulley half that I had to use a little heat from a propane torch to free it from the shaft.

Clean the shaft using steel wool or fine sandpaper. It will surely be corroded. Clean out the pulley

halves, keys and keyways and apply a thin coat of lithium grease. Very thin, just enough that the pulley slips over the shaft without catching.

I took advantage of the opportunity to clean and grease the bearing. The only grease I could think of that would be more or less impervious to high heat and high speed and provide proper lubrication was wheel bearing grease. Don't overdo it. Once everything is back together, the bearing does not align with the belts so any overspray should be harmless.

I also cleaned and repaired the worm screw assembly.



This is what I found when I removed the bracket and worm screw. Remember what I said about metal parts rubbing together without lubrication? I cleaned this up with sandpaper and cut a thin UHMW plastic washer which now sits in the depression caused by the rubbing of the screw. That stuff should last for about 25 years! And it is now nice and slick.



I also found that the parts holding the worm screw nut were badly bent. No doubt caused by me trying to adjust the speed. The photo above explains why this operation was so hard to do, sometimes requiring 2 hands just to turn the wheel. There are 2 of these and they should be straight. If need be, clamp them in a vise and bend them back.

That should be it. Put everything back together using the other topics included here and everything should be fine.

Replacing the Main Drive Belt

Let's say the main drive belt has broken and needs to be replaced. As in the sections above, remove the tray and the red cover off the headstock. I strongly recommend you remove the upper spring assembly as described above any time you have a chance. It's a good way to stay on top of problems and allows you to clean the shaft and pulleys and lubricate. Or, if you choose, you can leave the upper assembly on and proceed directly with replacing the belt. It'll be a little bit of a pain but it can be done.

Unplug the lathe if you haven't already done so. Remove the speed adjustment knob, the little black spacer, and the side cover and set it on top of the lathe without disconnecting the wires.

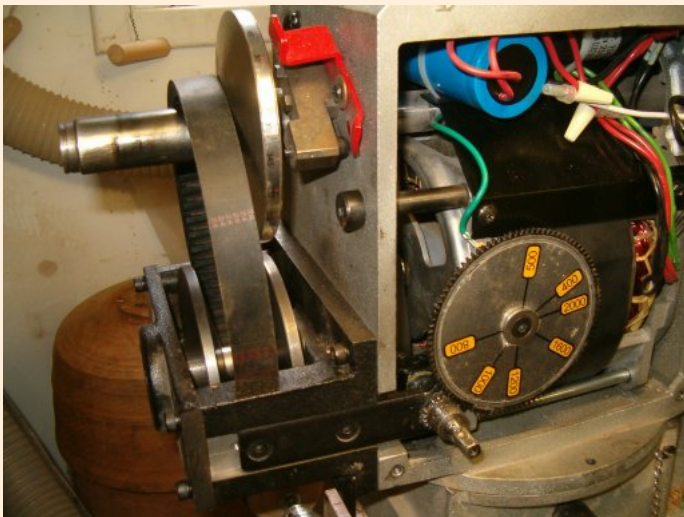
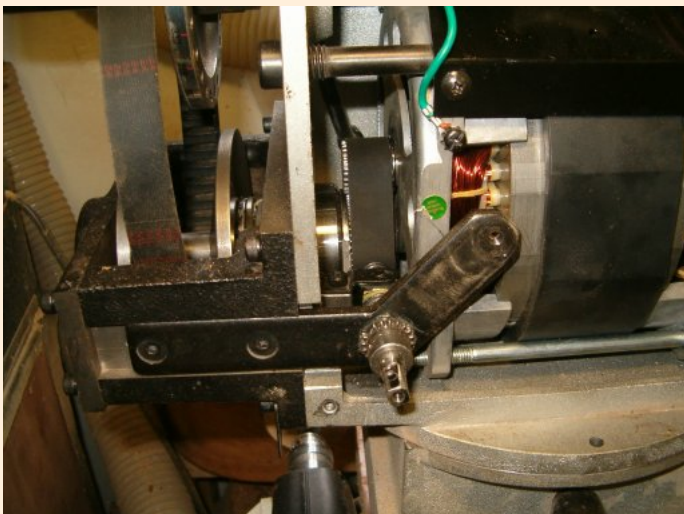


Figure 8 shows the starting point, Note that I have removed the upper assembly. Again, it is not necessary but recommended.



Remove the speed selection indicator.



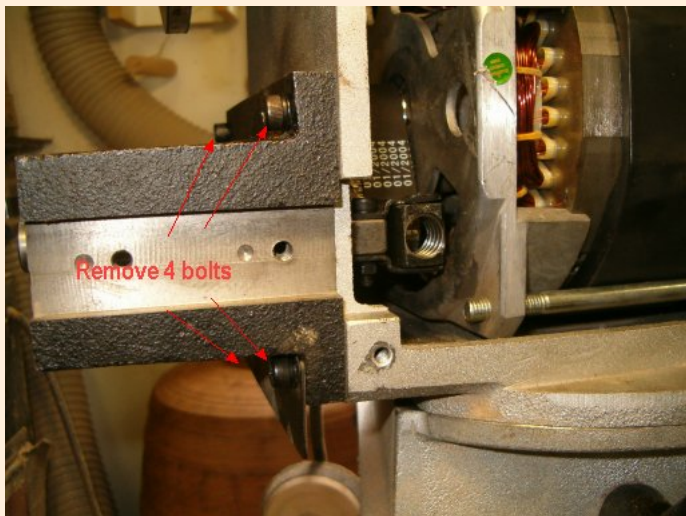
Remove the speed selection indicator gear.



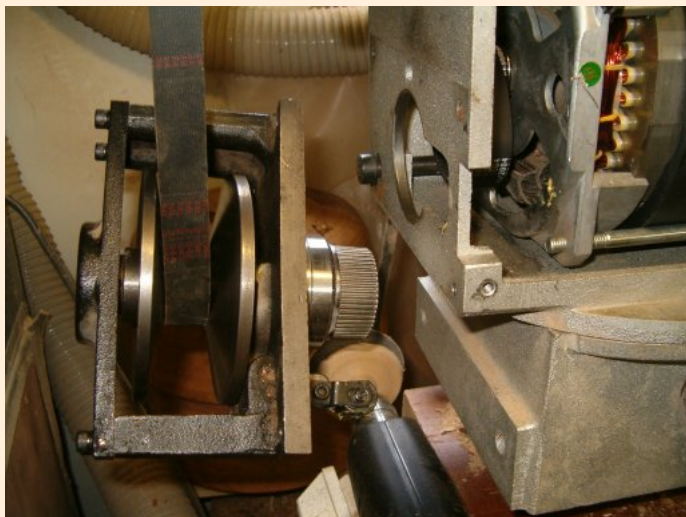
Remove the speed selection indicator bracket.



Remove the speed selection worm screw. Note that I have just serviced my lathe and I have used lithium grease to lubricate the worm screw and nut.



Remove the 4 bolts that hold the transmission assembly to the head stock.



Remove the transmission. If the variable speed belt is still in place, the transmission will hang from it. Reach inside and remove any broken belt. This is a good opportunity to blow out any dirt. Slip the replacement belt over the end of the motor, then insert the transmission back in. Turning the pulleys will

assist in seating the belt on the gears.

Re-attach the transmission using the 4 bolts. Screw in the worm screw and attach the bracket using the 2 screws. Do not re-install the speed selector gear and indicator yet. If you did remove the upper clutch assembly and spring, you will need to re-install this now.

Adjusting the Speed Selector

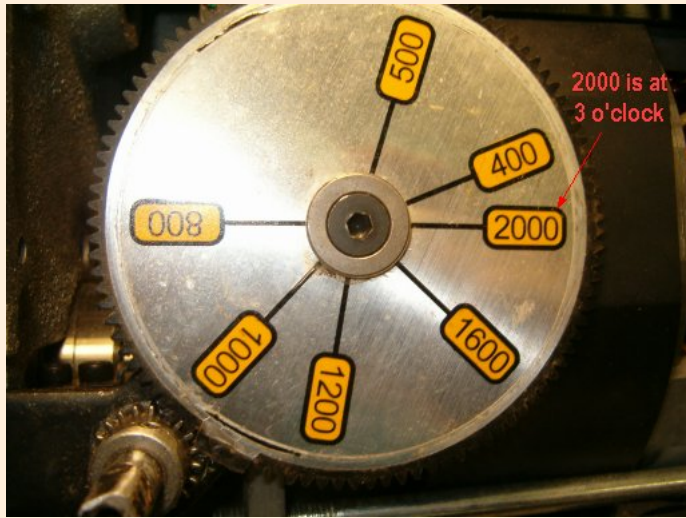
Now the lathe is back together except for the Speed Selector indicator. On the worm screw shaft, slide on the red plastic adjuster knob. No need to screw it in place. Turn the lathe on and using the knob, turn toward the highest speed and keep your eyes on the end of the worm screw. The nut will travel along the screw and move toward the belt you just installed. **DO NOT** let the nut touch the belt or it could cut into it and ruin it.

Keeping your eyes on the nut, get as close as you can to the belt without touching it. At some point, you may hear the bearing start to rattle a bit. This is the stop point. It means the adjusting fork has reached the end of its travel and the bearing race is no longer making proper contact with the balls inside it. Back the screw up enough to stop the rattling. What I normally do here is back it off about another 1/4 turn and turn off the lathe.



Do NOT let the adjuster nut contact the belt. You control this directly by turning the knob. **There is no built in stop of any kind to prevent it from going too far.**

The lathe is now set at the fastest speed you can get out of it. Remove the red knob.



Attach the indicator using its mounting screw making sure the indicator points the 2000 at the 3 o'clock position. The indicator has a spot where 3 teeth or so are missing. This spot should be resting against the gear to prevent the indicator going any further.

Once this is done, you can now re-install the cover, the black spacer, then the red selector knob. Re-install the cover on the back of the headstock, then the tray on top and you are done!

Main Belt Size Modifications

I have had to change the main drive belt 3 times so far, each time after a bad catch. That funny little "drrrr" sound you hear when you have a catch or when you forget to release the indexing wheel is not slippage, it's the motor and transmission shaft gears ripping the teeth off the main belt. Smart, isn't it? What a concept! All the other belts on this lathe (there are 3, you knew that, right?) are conventional "V" type belts where the grooves run along the length of the belt. The main belt is not. It closely resembles the timing belt in your vehicle but it's 4" long instead of 40". It is a 3/4" wide belt, a 3mm pitch, and is 207mm long.

Take this belt or its specifications to a belt dealer and they will tell you they cannot match it. First, they all think it's a timing belt. It is not and you will have to tell them so, it's only a drive belt. Second, they will quickly find that Gates, the manufacturer, doesn't even list it and that, at best, other manufacturers only have a 204mm or a 210mm belt. The first is too small, the second too big. Sears had it custom made!

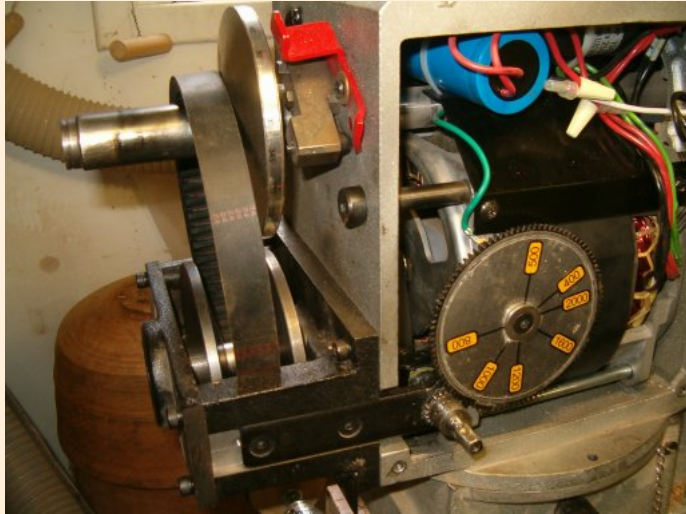
There is but one supplier for this belt and it's Sears. Canadian price, with taxes is \$53.58. US price is \$26.82 plus taxes. The parts have to come from the manufacturer in Asia! They don't even stock parts!

If you want to know how to get around the \$54.00 belt problem, the next section is a step-by-step procedure which worked well for me. As of this writing, I have had to replace no belts for over a year. **The following procedure involves modifications which surely totally voids your warranty. Let me repeat that...It involves modifications which surely totally voids your warranty. Got it?**

I already know that the 204 mm belt will not work. It is too tight and the gears it surrounds come too close to each other. If any of the motor mounting screws loosen up at all, they will touch and you will

end up with 2 nicely polished wheels instead of 2 gears. You don't want that. I chose the 210mm belt, made by Jason and available at any reputable belt dealer in your area. The cost in Canadian dollars is \$11.97, or roughly 20% of what Sears wants. From where I sit, this is a worthwhile saving.

This is best done when you have taken everything apart and cleaned and lubed all the necessary components. The head stock is now apart.

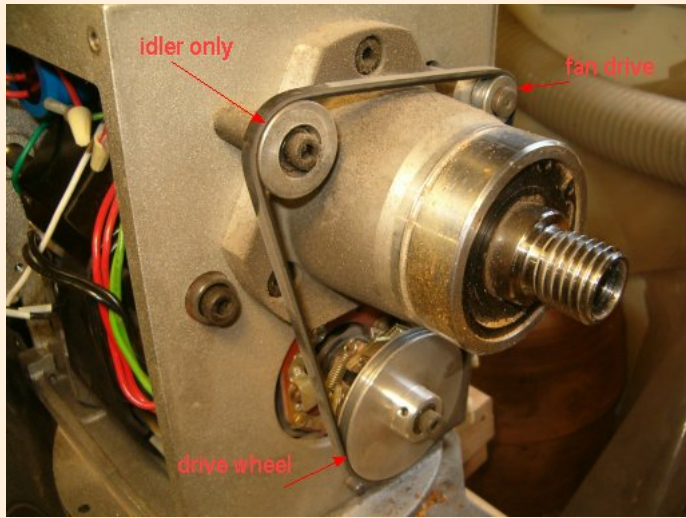


Look at the picture on the left. See the green wire on the left? Under the blue capacitor? You can see a big black bolt whose head sticks out through the casing of the headstock. It's not a bolt. It's a really long nut and you will need a 6mm hex key to remove it.

You will need to remove the front cover of the lathe to reach the head of the bolt that uses the really long nut above.



To do this, use a dental pick or any other kind of pointy object, and carefully pull out the "O" ring that acts as the front cover retainer. Remove the cover



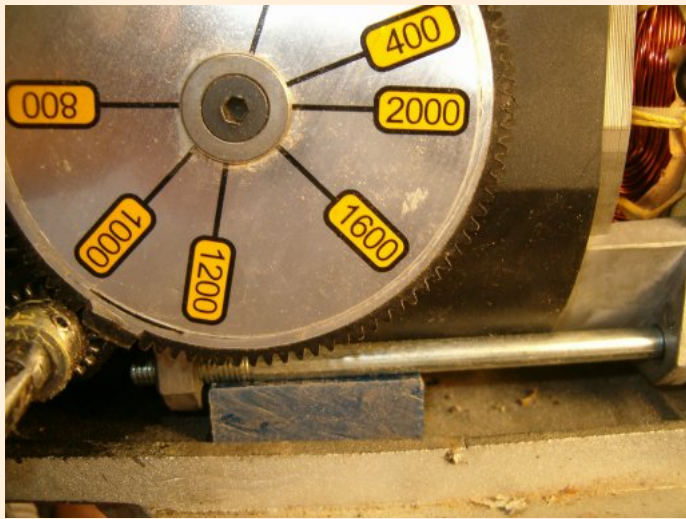
Well, well! There's the 3rd belt I was telling you about earlier. Its purpose is to turn the shaft on the upper right which is attached to the teeny-weeny little fan that cools the motor. Click on the photo to clearly see what the other parts are.

In the photo above, you can see the head of the bolt that holds the motor in place, which is attached to the really long nut on the other side. When I did this next step, I expected to hear a bunch of tinkling sounds but there weren't any. Remove the bolt, and remove the long nut. There are no spacers or anything like that hiding behind the black tin plate so go ahead and take the bolt out. The long nut is screwed into the end of the bolt as well as into the case. You can remove this as well as the sleeve that's on the other side around the head of the bolt.

The motor will now drop down. This is why the transmission shaft has to be removed first. What you are looking to do is to raise the motor from its normal position up 3mm which is the difference in size between Sears' belt and the new Jason belt (210mm - 207mm = 3mm).



This is the motor in its new position. I have re-inserted the long nut just for show. The distance between the original position and the new should be 3mm.

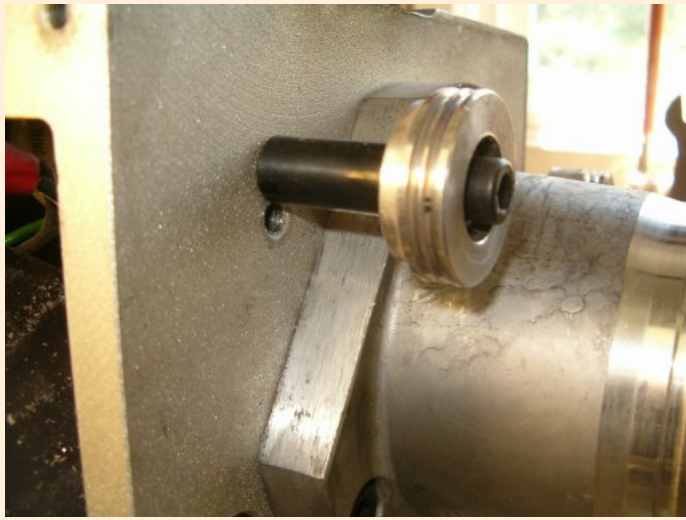


I have chosen to raise the motor with UHMW plastic spacers. The thickness of the spacer is 13/16". Many other lathes have only one bolt holding the motor which hangs and is supported by the belt. The only difference here is that the motor is raised, not dropped. Mechanically, it should be just as sound. Time will tell. At \$10 a belt I can experiment and if worse comes to worse, this modification is totally reversible as you'll see later.

Now the only major surgery...

At the front of the headstock, upper left corner is an idler. It has to be moved because the belt is now too loose. Remove the belt and the idler. You will need to drill a small hole, above the present thread of the idler retaining bolt. For this, you can use a 5mm or equivalent drill bit. Allow just enough room above the present hole to thread the new hole to it's 6mm size using an ordinary tap.

The new hole has been drilled and tapped with a 6mm tap and the idler is re-installed in it's new hole. Make sure that you cover the front of the motor and the inside part of the case when you drill. **Metal fillings and electric motors don't play well together!** I used a magnetic business card you get as refrigerator



door magnets on the inside positioned such that any fillings fell on it and not into the motor windings. Any good magnet will do as long as it catches the iron fillings. On the outside front, I just used an old towel wrapped around the motor switch.

You can now re-assemble the headstock using your new 210mm belt and tell Sears to kiss your butt! If you decide that this doesn't work for you, open the headstock, take it apart, remove the UHMW spacer, re-insert the motor retaining bolt bushing, the bolt, and the long nut. Open up the front, unscrew the idler and put it back where it was and there you have it...**modification totally reversed.**

Well folks, that's it for this installment of Fun Times with my Craftsman Lathe! If this has been any help to you at all, I would appreciate hearing from you. Please let me know if you found this page useful by sending me an [email](#). Thanks.



I would like to throw in a small tip. If you drill your tool holder with a corresponding hole on the other side and tap it to fit, you can change the handle from one side to the other when it gets in the way.

Things to remember about your Craftsman Lathe's Hydrophobia

Do not sneeze in front of your lathe

Do not perspire on your lathe

Do not let the weather man on the radio announce precipitation

If you need to mention H₂O, stick your fingers into both ends of the spindle shaft (that's how lathes hear)

If there is you-know-what falling, close the curtains

Do not drink in front of your lathe

If you need to pee, just walk outside. Don't tell anyone where you're going